Human Biologists in the Archives

Demography, Health, Nutrition and Genetics in Historical Populations

EDITED BY

D. ANN HERRING
McMaster University

and

ALAN C. SWEDLUND
University of Massachusetts, Amherst

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ALAN C. SWEDLUND AND D. ANN HERRING

Introduction

A few years ago we began a conversation about how the use of archival data in biological anthropology was changing. Whereas in the past archival research was conducted by a very small number of us (see Foreword, this volume), that number seemed to be growing steadily. In addition, questions, themes, and approaches appeared to be emerging that gave archival research its own character and rationale. Rather than simply being an adjunct, less desirable alternative, or even an afterthought to field or laboratory work, archival research had become the approach of choice for some researchers and some questions. Today, a significant number of physical anthropologists engage in research on populations whose data come primarily from the historical record. In addition, distinctive approaches have emerged from these investigations that can be differentiated from the work of colleagues in, for example, historical demography or the history of medicine (see chapter 14). We also observed that there has been little opportunity to assemble a body of this work or to reflect on its common themes or its contributions to theory and method in physical anthropology. The purpose of this volume is to provide a forum in which researchers who are actively engaged in historical projects present their current research and at the same time more explicitly consider its place in physical anthropological theory and method.

The articles in this volume are new contributions to the physical anthropology literature. They are based on updated and expanded papers presented in a symposium entitled *Human Biology in the Archives*, held in Columbus, Ohio, in April, 1999. The symposium was jointly sponsored by the Human Biology Association and the American Association of Physical Anthropologists. For these authors, the classic anthropological 'field' is not the glamour of research in an exotic locale; rather, it often involves long hours consulting collections curated in the dusty back rooms of libraries, laboratories, and museums. Data collection can be tedious anywhere, but these repositories rarely offer the compensatory experiences that can be found in many field locations. What archives do provide

are rich sources of information and multiple lines of evidence that can be used to reconsider traditional questions or address new concerns in biological anthropology. By virtue of their historical context, they also invite another layer of questions about time, place, and purpose surrounding their original assemblage and the circumstances related to their eventual preservation.

The contributors to this volume present a diverse array of archived human biological evidence from a variety of sources, including the archeological record, skeletal collections, and school, government and church documents. This collection showcases a variety of approaches, and includes investigators who are beginning their careers in archival research as well as senior scholars who have been engaged in this kind of investigation for many years. The chapters demonstrate the ways in which the analysis of archived historical documents and biological remains expands the horizons of research in human biology, fills gaps in the chronologies of anthropological populations, extends the longitudinal analysis of microevolutionary and social processes into the present, and enhances our understanding of the human condition.

What is an archive?

In conventional terms most of us probably think of an archive in a somewhat restricted, dictionary sense, as a collection of written records. But the archives of human biology are much more than that. As we look over the use of archival approaches that are being employed in biological anthropology today we see that they include the published and unpublished data of numerous studies in anthropometry, growth and development, genetics, nutrition, demography, paleoanthropology, and so forth. However, they also increasingly employ digitized files and manipulations of these derived forms of the original data. Importantly, they also include repositories of fossils, skeletal remains, photographs, blood and tissue samples, and even cell lines used in DNA research. For those of us who investigate human biology in an archival context, therefore, the definition of archive is broad and extends well beyond written documents. While it was not possible to explore the full range of data sources for this volume, we want to acknowledge and encourage the continuing experimentation with diverse types of archives. What is central to us is that these be seen for their historical significance and that researchers are encouraged to preserve their original data for the use of future investigators, as called for in the Foreword to this volume.

Many of the archives traditionally used in research by physical anthropologists are ‘accidental’ data sets. That is, the data were gathered for purposes quite different from the ways in which we deploy and interrogate them today. A most obvious example would be the census records and vital statistics marshaled

by states, churches, and municipalities and which make up the great body of archives used in historical demography and population structure. Another might be the anthropometric data amassed on men who were historically being surveyed for eligibility for military service. In these examples the empowered agencies desired this information primarily to maintain surveillance over, tax, marry, conscript and bury their citizenry. However, now a very large body of literature exists using these same kinds of data for studies in mortality, growth, nutrition, population structure/genetics, and epidemiology (see, for example, Damon 1968; Tanner 1981; chapter 14, this volume).

A second type of archive is one that has been created as a result of questions that can be considered explicitly anthropological/biological, such as anthropometric data gathered during anthropological surveys. These archives provide the opportunity to revisit and reevaluate previous research in light of new technologies, approaches and methodologies, as well as to analyze data anew to address contemporary questions (Jantz *et al.* 1992; chapter 3, this volume). With the penetration of globalization, the increasing cosmopolitan-ness of indigenous groups, the independence of formerly colonized peoples, and the increasingly difficult conditions under which fieldwork is conducted in the twenty-first century, these kinds of archives will not only be useful in the years ahead, but we would argue that they will be essential to the continued existence of biological anthropology and to the future of the biocultural enterprise as a whole (see Goodman and Leatherman 1998; Smith and Thomas 1998). Whether the area of inquiry be human genetics, bioarcheology, or paleoanthropology, in our estimation, new data collected specifically for studies of human biology will become increasingly difficult to acquire. Legitimate concern by Aboriginal groups in Canada and the United States, for instance, about the removal, study and reburial of the skeletal remains of indigenous people has effectively limited analysis of newly discovered sites (Waldram *et al.* 1995; Thomas 2001); resistance by indigenous people to the collection, analysis and curation of samples of their DNA is another example of the same phenomenon. The positive sides of this are that there are so many useful archives now available (Foreword, this volume), and that many productive collaborations between First and Third World research teams and between scientists and indigenous groups are being fostered.

Biological anthropologists seldom find time to reflect, or at least write, on the power and privilege that has allowed us to conduct research in many Third World and colonial situations. The historical archive, because it is often a product of colonial administrations, does not have to be a military census or measurements taken on institutionalized individuals to remind us that the original agenda that led to the creation of the archive might be one very different from our current, scientific purpose. In being so reminded the archival researcher may find herself addressing questions somewhat differently than she would otherwise. Several

contributions in this volume illustrate how different historical archives – be they from a state-run asylum in New York (chapter 6) or a Roman Catholic mission in California (chapter 4) – can be used to study the biological consequences of political, religious and medical regimes.

One of the other benefits of researching archival data has been that it has often focused attention on 'ourselves': namely, Western and Westernized populations from whom most biological anthropologists working today descend. 'We' become 'the other.' Since these populations, primarily in Europe and North America, have such a long record of documenting and recording numerical data, it is these populations that now make up the bulk of archival sources. Indeed, many of the major studies on historical population structure originated with populations in the United Kingdom and continental Europe (see chapter 14 for examples).

One such project, the Otmoor–Oxfordshire study conducted in England by Drs Geoffrey Harrison and Anthony Boyce (see, for example, Boyce *et al.* 1967) was a primary catalyst to one of us (Swedlund) choosing to do historical research. Another project, on the British colony of Gibraltar by Dr Larry Sawchuk (see, for example, Sawchuk 1980; Sawchuk and Flanagan 1979), sparked the interest in this kind of research for the other author (Herring). The Otmoor study also represents a very good example of how archival data on the history of a population can also be linked to research on contemporary human biological variation. The fact that, in the popular imagination, physical anthropologists are usually only recognized as scholars of 'old bones' and 'exotic' populations is illustrated by an anecdote regarding the Otmoor study. While one of us (Swedlund) was attempting to order a copy of Harrison's recent compendium titled *The Human Biology of the English Village* (Harrison, 1995), the clerk remarked, 'That is a curious title!' When asked how she meant 'curious' she indicated that the title was 'odd' or 'strange'. Indeed, we suspect someone from a university press or bookstore would find nothing odd in a title like '*The Human Biology of the Peruvian Village*' or '*The Human Biology of the Australian Aborigine*,' but somehow the topic seemed curious when applied to a contemporary British village and its recent historical records. Dr Harrison is to be commended for this title and its topic, as it demonstrates the way in which investigations of contemporary Western societies tends to democratize our research questions, whether they are archival or not.

Explorations in archival research

Much of the early work of human biologists in the archives is perhaps best characterized as genetic demography (see, for example, Crow and Mange 1965;

Küchemann *et al.* 1967; Lasker 1977; Roberts 1971). Archival data were used primarily to develop genealogical histories of populations with a view to understanding the operation of microevolutionary processes of human adaptability, gene flow, genetic drift and natural selection. As more research was undertaken, it became increasingly clear that archival projects lead to questions outside of this traditional biological domain and demand an exploration of social processes, historical moments, and the lives of individuals represented in the records (see chapter 14). Human biologists studying archival data are inevitably confronted with interpretive dilemmas around issues of epistemology, representation, the large and small tragedies of daily life, and the history of physical anthropological theory and method.

While archival data continue to offer an important and effective means for examining the genetic history of populations, the results are increasingly interpreted in terms of historical contingency, political economy, and the complexity of the sociocultural context that shapes biological and genetic processes (chapters 2, 3 and 14). Historical archival research provides added depth and new data with which to address questions about the way in which, for example, episodes of infectious disease affect the growth and development of children (chapter 7), about the sociopolitical circumstances that influence the course of epidemics (chapters 8, 9 and 10), how epidemics spread from place to place (chapter 11), and how gender relations affect vulnerability to disability, disease and death (chapters 4, 6 and 12). It also affords the opportunity to examine the way in which particular health issues, such as malnutrition, have been understood as the field of human biology itself has developed (chapter 13). Skeletal and cemetery records are being carefully linked to show how each informs or compensates for weaknesses in the other and how the tissue and documentary records themselves have been formed by social circumstances (chapters 4, 6 and 12).

The chapters in this volume do not fit comfortably within any identifiable subfield of physical anthropology. We would argue that this is in the nature of archival research. The areas of potential investigation are only limited by the availability of data in some archival form, and by the imagination of the investigator. In organizing the chapters for this volume we therefore have avoided assigning the contributions into standard categories such as osteology, growth and development, or genetics. Rather, we see the contributions as loosely structured around four main themes that cross-cut the classic boundaries within physical anthropology: population history (chapters 2, 3 and 4), the biological consequences of institutional living (chapters 5, 6 and 7), the impact of demographic and epidemiological crises (chapters 8, 9 and 10), and methodological and epistemological implications of archival research to human biological inquiry (chapters 11–14). Even these groupings are not mutually exclusive, but

they serve to draw the reader's attention to the primary research question of each contribution. In addition, the reader will note that the articles cover a range of geographical locations (Costa Rica, Ireland, Canada, Gibraltar, USA, Finland, England) and historical periods from the sixteenth to the twentieth centuries.

Contributions

Physical anthropologists are carving out distinctive niches in archival research if the chapters in this volume can be considered representative of the area as a whole. This is beautifully illustrated in Smith's masterful review of central tendencies in the development and practice of archival anthropology (chapter 14). He makes the case that, whereas anthropologists, historians and geographers often explore similar archival terrain and employ similar methods (and perhaps feel that they share more intellectual ground with each other than they do with colleagues in their disciplines), the work of human biologists in the archives is indeed distinctive. For Smith, elucidation of evolutionary mechanisms and investigation of the components of the genetic structure of populations fall unequivocally within the domain of biological anthropology and sets it apart from other areas of inquiry. The boundaries with other disciplines become blurred, however, when that research touches on questions relating to fertility, mortality and disease, as it inevitably must. Here human biologists occupy common ground with social and medical historians, demographers, historical geographers, and even economists and political scientists, and each informs the perspective of the others in both small-scale local analyses, and in developing global-scale models of human behavior. Smith believes that an interdisciplinary approach, coupled with the integration of fine-grain local studies, is necessary for any systematic analysis of the effects of broader social processes and historical contingency on human biology and microevolution.

The crucial place that context and contingency occupy in understanding human biology through time is not always made explicit in research in physical anthropology. Often the study 'subjects' are treated in isolation of the dominant populations with whom they interact – what Smith and Thomas (1998: 460) call 'the biological cocoon.' Yet that dynamic figures prominently in many of the chapters in this volume. This can be seen clearly in Herring and colleagues' chapter (13) on the deleterious impacts of the fur trade and government policies on health and nutrition among the Moose Factory Cree of northern Canada. In Walker and Johnson's study (chapter 4) we observe the destructive effects of Spanish colonial policy, and religious and political agendas, on the health and reproductive patterns of the Chumash of coastal California. Higgins and Phillips (chapters 5 and 6) examine the health of institutionalized people who are in a

very different social and medical relationship to the dominant society than their non-institutionalized counterparts. Higgins' study of nineteenth century infant death in the Erie County Almshouse (New York State) lends support to the idea that the underlying motive for establishing such institutions was to deter all those but the most desperate from seeking relief. Phillips demonstrates how nineteenth century labor therapy at the Oneida County Asylum for the Mentally Ill (New York State) – which was ostensibly designed to control the inmates, reduce the costs of running the institution, and 'recreate a normal life' – resulted in extreme skeletal robusticity among the inmates as they were literally 'worked to the bone'. Leidy Sievert (chapter 7) looks at a very different kind of institutionalized population, one that is statistically at the other end of the spectrum, that is, privileged and economically well-cared-for boarding school students in a twentieth century New England middle school. This population permits her to investigate questions related to nutrition and infectious disease in a controlled, natural experiment where the positive impacts of adequate nutrition and high socioeconomic status are much more easily observed.

Relethford's contribution (chapter 3) is noteworthy not only for the intriguing inferences he makes about the population history of Ireland, but also for his creative use of anthropometric data for adult Irish men and women, collected by researchers at Harvard University during the 1930s and by researchers affiliated with the Anthropometric Laboratory of Trinity College, Dublin, in the early 1890s. His comments on the historical context of these data make explicit the political nature of this research in its earlier manifestation. Whereas these data originally formed the basis for antiquated questions about racial difference, here Relethford uses them instead to look at a contemporary question about how anthropometric variation can inform our understanding of population history in a manner similar to variation in DNA. In his re-analysis of the data, he argues that spatial variation in anthropometric patterns reflects social processes by which communities in Ireland were formed, especially the influence of Viking and English invasions, settlement and admixture.

Madrigal (chapter 2) focuses her cool critical eye on the parish records from Escazú, Costa Rica. Her chapter presents a classic analysis of population structure revealed through fertility, mortality and marriage records. The results confirm observations made in several historical populations, namely, that the evidence for the effects of gene drift are weaker than those of gene flow through high mobility of marriage partners. She finds that variation in fertility is probably less important than differential mortality in accounting for biodifferentiation.

Mielke (chapter 10), Sawchuk and Burke (chapter 9), and Swedlund and Donta (chapter 8) explore mortality under the stressful conditions of war, crowding and epidemics. Historically, these three factors are often intertwined, as Mielke demonstrates in his study of regional patterns of death on the

Åland Islands, an archipelago located between Sweden and Finland, during the War of Finland (1808–09). His analysis of the extraordinarily rich archival resources for the archipelago helps to disentangle the impacts of outright hostility and aggression from other social and biological effects that accompany military movements and activities. Mielke's study illustrates very clearly the ways in which elements in the 'epidemiological landscape' (Dobson 1992), in conjunction with sex and age, shape spatial variation during mortality crises.

Sawchuk and Burke examine the impact of cholera on the wonderfully well documented civilian population of Gibraltar during the nineteenth century. Their analysis of the differential impact of cholera in the various districts of the town illustrates how inequalities in wealth, status and residential location are strong determinants of vulnerability to morbidity and mortality (cf. Farmer 1996). Where Madrigal (chapter 2) would suggest that differential mortality is a function of natural selection in Escazú, Sawchuk and Burke (chapter 9) emphasize the socioeconomic and cultural risk factors contributing to the risks of contracting and dying from cholera in Gibraltar. In Swedlund and Donta's chapter (8) the epidemic of interest is the scarlet fever pandemic (*Streptococcus pyogenes*) of the second half of the nineteenth century. Their analysis of scarlet fever deaths during 1858–59 and 1867–68 is directed toward four communities studied by the Connecticut Valley Historical Demography Project. They observe that a number of deaths occurred in households considered to be of middle-to-high socioeconomic status, exemplifying that 'democratic diseases' like scarlet fever flow easily across class and other social boundaries, in contrast to 'undemocratic diseases' like cholera (Porter and Ogden 1998). Not only do they evaluate the demographic, economic and cultural factors that contributed to the likelihood of death from scarlet fever, but they also raise questions about the virulence of the pathogen itself. They conclude that enhanced pathogenic virulence may have been a major determinant of this local manifestation of the larger epidemic, a timely reminder that in seeking explanations for epidemics, we ignore at our peril the significance of evolutionary shifts in the pathogens themselves (Ewald 1991a,b).

Grauer and Sattenspiel's contributions (chapters 12 and 11) caution that all is not rosy under the archival sky. Each of these chapters deals with aspects of missing data, and provides approaches and suggestions of how to deal with data deficiencies. In Grauer's chapter, the case is made by comparing English Medieval history, as represented in documents, to another, different history exposed through the analysis of skeletal remains from cemeteries from the period. She addresses the problem of the under-representation of women in written documents, relative to the abundance of their remains in cemetery samples. The problem is not uniquely English, Medieval, or even historical, but is amplified in historical data because the socioeconomic status of males has traditionally

meant a greater emphasis on the recording of their lives, events and activities. Grauer makes the case that coupling skeletal data with historical records can begin to redress this imbalance (see also Grauer 1995; Saunders and Herring 1995).

Sattenspiel (chapter 11) takes on the broader issue of how archival taphonomy and sampling processes can leave us with data that are inadequate for the questions we wish to ask. By using mathematical distributions known to represent demographic and epidemiological processes fairly well, and by applying mathematical and computer modeling approaches, she makes the case that it is often possible to provide estimates for missing parameters that, in turn, make new inferences possible. She shows how effective models can be developed and illustrates the process by way of her research on the spread of the 1918–19 influenza epidemic in Cree fur trapping communities in the Canadian subarctic. Sattenspiel argues that mathematical modeling enhances traditional approaches to archival research because it provides direction, focus, and a powerful tool for identifying factors that are most influential, less important or even insignificant in demographic and epidemiological patterns.

Finally, we have aimed to give the reader a cross section of archival studies that shows the varieties of themes and approaches that are currently being investigated. There are many other fine examples emerging in the literature and, taken together, we believe that these justify the argument that human biology in the archives is a growing field with a promising future. We would like to add that we find in many of these studies something that is characteristic of the best traditions in biological anthropology, no matter where undertaken or what time period is under consideration. That is, virtually all of these studies deal with communities or populations in a way that enriches our understanding of them beyond the simple reporting of numbers and events. The best archival research strives to bring life to the aging documents and museum collections on which we depend. In doing so, not only is it possible to carry out more interesting science, but also to represent and give voice to the individuals whose lives are represented in the archival record.

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